

REPORT ON THE FRESHWATER
GASTROPOD MOLLUSCS OF
LOWER MESOPOTAMIA.

PART III.—THE FAMILIES NERITIDAE, HYDROBIIDAE
AND MELANIIDAE.

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Since the publication of the first two parts of this series, the Indian Museum has received a valuable collection of Mesopotamian molluscs from Dr. E. W. Howell, made by him at Basra during August 1917—February 1919, and placed with great generosity at our disposal. This collection, together with the collections mentioned in the previous parts of this report has rendered the working out of the Mesopotamian molluscs much easier and more satisfactory. Specimens of the families reported on in the first two parts of the report are also represented in this collection, but these do not offer any specially interesting points for further discussion. They belong to the following species:—

<i>Limnaea tenera euphratica.</i>	<i>Gyraulus convexiusculus.</i> ¹
<i>Limnaea peregra canalifera.</i>	<i>Gyraulus euphraticus.</i>
<i>Bullinus contortus.</i>	<i>Gyraulus intermixtus.</i>

The only point to be noted in reference to these is that the large series of *L. peregra canalifera* exhibits much greater individual variability than the specimens previously examined.

Family NERITIDAE.

Genus *Neritina*, Lamarck.

Subgenus *Dostia*, Gray.

1919. *Dostia*, Annandale and Prashad, *Rec. Ind. Mus.*, XVI, pp.
242, 243

In the paper cited above Dr. Annandale and I considered *Dostia*, Gray, as distinct from *Neritina*, Lamarck, but as a result of further examination of the rich collections in the Indian Museum I am inclined to consider it as worthy of subgeneric rank only.

¹ We would invite attention to the fact that there has been an unfortunate transposition of lettering in reference to *Gyraulus euphraticus* and *Segmentina calathus* in fig. 5 on page 40 of this volume. The figure D refers to the *Segmentina* and the figure F to the *Gyraulus*. [N. A. and B. P.].

In the Mesopotamian collection before me it is represented by Mousson's species *N. schlaeflii* which was originally described from the Persian Gulf.

***Neritina schlaeflii*, Mousson.**

1874. *Neritina* (*Mitrula*) *schlaeflii*, Mousson, *Fourn. Conchyliol.* XXII, pp. 49, 50.
 1874. *Neritina crepidularia*? var. *Schlaeflii*, von Martens, *Vorderasiat. Conchyl.*, pp. 44, 67, 124.
 1879. *Neritina crepidularia* (in part), von Martens, in Chemnitz, *Conch.-Cab., Neritina*, pp. 37-45, pl. vii, figs. 9-11.

This species was described by Mousson from shells collected on the island of "Ghaes" in the Persian Gulf. He noted the resemblance between it and the Oriental species, *N. crepidularia* and *N. depressa*, but considered it distinct from either owing to the much smaller size of the shell, the much less convex and laterally compressed dorsal surface, in the spire being more recurved and flattened, the nucleus being more prominent and in having a much smaller though comparatively more elongate mouth-opening. According to von Martens, it is only a variety of *N. crepidularia*, but the two Mesopotamian specimens collected by Dr. Bowell at Basra leave no doubt in my mind that it is specifically distinct.

The Mesopotamian specimens have a purplish background with a large number of irregular white spots resulting in a network of rather broad purple lines surrounding the white spots; near the margins of the shell it assumes a blackish tint owing to the darkness of the ground colour and absence of the white spots.

Through the kindness of Major Froilano de Mello of the Portuguese Medical Service in Goa, the Indian Museum has received a specimen of this species from near Goa on the west coast of Peninsular India. This specimen is of a uniform dark brown colour. This record greatly extends the range of *N. schlaeflii*.

Subgenus *Neritaea*, Roth.

1879. *Neritaea*, von Martens, *op. cit.*, p. 16.
 1899. *Neritina* (*Neritaea*), Kobelt in Rossmässler's *Icon. Land.-u. Süßw.-Moll.* (n. f.) VIII, p. 1.
 1913. *Theodoxis*, Preston, *Fourn. As. Soc. Bengal*, IX, pp. 470, 471.
 1915. *Theodoxis*, Preston, *Faun. Brit. Ind. Freshw.-Moll.*, p. 5.

In his monograph of the genus *Neritina*, von Martens divided it into six subgenera, and included the species dealt with here in the subgenus *Neritaea*, Roth. This subgenus he further subdivided into eight groups according to the shape, sculpture, etc., of the shell. In the synopsis of these groups he included *N. jordani* and the other Mesopotamian species of the genus in the group Pictae, but further on in the descriptive part of his monograph included them in the account of the group Semicirculatae. This is evidently a mistake since the group Semicirculatae is confined to Central America and South Africa, while the Pictae group is found in the tropical and subtropical regions of Asia, Africa and

America. Moreover the structural characters of *N. jordani* and its allies do not justify their inclusion in the group Semicirculatae.

Preston, following Locard¹ and Dautzenberg,² assigns these species to the genus or subgenus *Theodoxis* or rather *Theodoxus*, Montfort. This is certainly wrong, since Montfort's name *Theodoxus*, as both von Martens and Kobelt have shown, should be reserved for the Palaearctic species of the *fluviatilis* type; the shells of the *jordani* type being included in the subgenus *Neritaea*, Roth.

Dr. Annandale recorded four species of the genus *Neritina* from Lower Mesopotamia. I have, however, found specimens of another in the collections made by Dr. Bowell at Basra. This form (*N. macrii* var. *michoni*) was only known hitherto from Syria and Palestine.

Neritina mesopotamica (Mousson), Martens.

1874. *Neritina meridionalis*, var. *Mesopotamica*, Mousson, *op. cit.*, p. 36.
 1874. *Neritina anatolica*, var. *Mesopotamica*, v. Martens, *op. cit.*, pp. 33, 34, pl. v, fig. 42.
 1879. *Neritina mesopotamica*, v. Martens, *op. cit.*, pp. 90, 91, pl. xiii, figs. 20, 21.
 1899. *Neritina mesopotamica*, Kobelt, *op. cit.*, p. 4, pl. ccxi, fig. 1325.

Mousson confused this species with the Sicilian *N. meridionalis* and gave a very incomplete description of his new variety *mesopotamica*. The same form was also described in the same year by von Martens under the same name as Mousson's, but apparently in ignorance of his work. Von Martens considered it to be a form of *N. anatolica*, but published a full description and a good figure, and also compared the variety with the species *N. michoni* and *N. bellardii*. Later in his monograph of the genus he considered it to be a species distinct from *N. anatolica* and worthy of specific rank. I have compared the single Mesopotamian specimen before me with specimens of *N. macrii*, var. *michoni*, from Palestine and Mesopotamia and with those of *N. anatolica*, var. *bellardii*, from Damascus, and am of opinion that the species, as von Martens decided, is distinct from either.

The single Mesopotamian specimen was collected by Dr. Boulenger on the banks of the Khandag creek, Basra. The spire of this specimen is not so prominent as is shown in von Marten's figures, but in other respects closely agrees with his figures and description. The inner lip is straight and has minute denticulations on its inner border.

Neritina macrii, var. *michoni* (Bourg.).

1879. *Neritina Macrii*, var. *michoni*, von Martens, *op. cit.*, pp. 88-90, pl. iv, figs. 11-13 and pl. xiii, figs. 27-29.

¹ *Arch. Mus. Hist. Nat. Lyon*, III, p. 231 (1883).

² *Rev. Biol. Nord. France*, VI, p. 349 (1894).

1883. *Theodoxis michoni*, Locard, *Arch. Mus. Hist. Nat. Lyon*, III, pp. 232, 233.
 1894. *Neritina* (*Theodoxia*) *michoni*, Dautzenberg, *Rev. Biol. Nord. France*, VI, pp. 351, 352.
 1913. *Theodoxis michoni*, Preston, *op. cit.*, p. 471.

There has been a great deal of confusion in literature as to the exact status of this form. Von Martens, who gives complete references to previous literature, was the first to recognize its relationship with *N. macrii*, Recluz, but in later works Locard, Dautzenberg and Preston have treated the species as distinct, and as belonging to the subgenus or genus *Theodoxis*. This view, as I have pointed out above, is not correct and the species should be assigned to the genus *Neritina* and the subgenus *Neritaea*. Kobelt¹ in his account of *N. macrii* says, "Martens hat *Neritina karasuna* und *michonii* mit *macrii* vereinigt, und zwar mit Recht," and therefore includes *michoni* only as a synonym of *N. macrii*. However, owing to the differences between the typical *N. macrii* and the form *michoni* I consider the latter as a distinct variety of the species.

The shells of this variety are less ovate than the typical form, have the spire a little more pronounced, the suture more impressed, the outer lip of the aperture extending much further over the columellar region, a relatively broader and more flat columellar region and the mouth shorter but broader.

In the Mesopotamian collections there are five specimens of this form, four collected by Dr. Bowell at Basra and the fifth from the Khandag creek, collected by Dr. Boulenger.

It may also be pointed out here that some of the specimens, collected by Dr. Annandale from the exit of the R. Jordan, Palestine, were described by Preston as being of an intermediate character between *N. michoni* and *N. jordani*. I have examined these specimens but can find no resemblances between them and *N. jordani* except for their colouration. This point is considered further under *N. jordani*.

Neritina jordani, Sowerby.

1861. *Neritina jordani*, and var. *turris*, Mousson, *Vierteljahrsschr. Naturf. Ges. Zurich* VI, pp. 151-152.
 1879. *Neritina jordani*, von Martens, *op. cit.*, pp. 84-86, pl. ii, figs. 14-16.
 1883. *Theodoxia jordani*, Locard, *op. cit.*, pp. 231, 232.
 1894. *Neritina* (*Theodoxia*) *jordani*, with var. *aberrans*, Dautzenberg, *op. cit.*, pp. 349, 350.
 1899. *Neritina jordani*, var. *turris*, Kobelt, *op. cit.*, pp. 2, 3, pl. ccxi, figs. 1319, 1320.
 1913. *Theodoxis jordani*, Preston, *op. cit.*, p. 470.
 1918. *Neritina jordani*, Annandale, *Rec. Ind. Mus.* XV, p. 162.

Dr. Annandale recorded the occurrence of this species in Mesopotamia from specimens sent to him from Nasariyeh. Since then we have received several shells from Basra collected by Dr. Bowell. This large series, together with the Palestine shells

¹ Rossmässler's *Icon. Land- u. Süßw. Moll.* (n. f.) VIII, p. 5.

already in the Indian Museum, makes it possible to discuss the individual variation in form and colour.

Sowerby¹ figures three shells of what he calls the three varieties of *N. jordani*, without indicating a typical form; his figures also are very poor. Reeve's² figures show a rather ovoid shell with a relatively small and scarcely exerted spire and with the body-whorl nearly smooth or with only a slight constriction on it. Mousson did not figure the shells he examined, but described a new variety under the name *turris*, which he distinguished from the typical form by its much larger size, more elevated apex, which makes the shell almost subcylindrical in shape, and by the body-whorl having a more prominent constriction. The figure of the typical form, the only one illustrated in von Marten's monograph, differs from that of Reeve's in having a comparatively shorter but more prominent spire, the columellar border narrower, the mouth relatively smaller and the constriction on the body-whorl much more pronounced. Dautzenberg, who followed Locard as to nomenclature, added a new variety (*aberrans*), which, according to him, is distinguished by the almost complete absence of the constriction on the body-whorl and by its variable but different colouration. Kobelt has given good figures of the typical form and of var. *turris*, Mousson. His figure of the typical form is quite similar to that of von Martens. Preston does not add any notes on the specimens examined by him, but says in his account of *T. michoni* that some of the specimens of this species link up the two species, *T. jordani* and *T. michoni*, and that these two are probably extreme forms of the same species only. Annandale, however, refers to some of the shells from Palestine and reported on by Preston as belonging to the var. *turris* of Mousson. In view of the above remarks it is clear that we have to deal with three forms. (i) *N. jordani* s.s. which von Martens' and Kobelt's figures may be taken to represent, and which appears to be a true lake-form occurring in the Lake of Tiberias and probably in the Lake of Homs. (ii) *N. jordani*, var. *turris*, described by Mousson and of which Kobelt's figure is a good representation. This form is stated to have been taken in the Lake of Tiberias, but the exact biological conditions under which it was found are not stated by either Mousson or Kobelt. In Dr. Annandale's collections and those of the late Dr. Anderson from those areas the form is only represented in the collections from the exit of the River Jordan. The form is probably a true stream phase. (iii) *N. jordani*, var. *aberrans*, described by Dautzenberg, but of which no figures have been published. The type specimens of this form were collected in the Lake of Homs and all the specimens from Mesopotamia in my opinion belong to it. This form appears to be confined to closed or slow-running waters.

The three phases discussed above may be distinguished by the following key:—

¹ *Conchological illustrations, Neritina*, pp. 4, 6, fig. 49 (1841).

² *Conch. Icon., Neritina*, species 129 (1856).

- I. Shell with a distinct transverse constriction on the body-whorl.
 - A. Shell not more than 8 mm. in maximum diameter; more or less ovoidal in shape ... *N. jordani typica.*
 - B. Shell measuring up to 15 mm. in maximum diameter; almost subcylindrical in shape and with the constriction of the body-whorl better marked than in the typical form ... *N. jordani, var. turris.*
- II. Shell with the body-whorl almost smooth or with only a faint transverse constriction across it ... *N. jordani, var. aberrans.*

The major part of the Palestine collection reported on by Preston and the shells from the Lake of Tiberias from the late Dr. Anderson's collection belong to the typical form (fig. 1*a*). They have the shell of an ovato-conical form with a prominent spire and a distinct though not very deep constriction across the

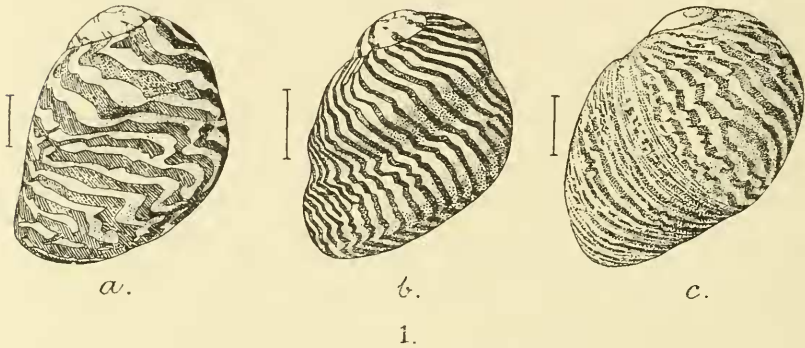


FIG. 1.—*Neritina jordani*, Sowerby.

- a. Shell of the typical form from Palestine.
- b. Shell of Mousson's var. *turris* from River Jordan.
- c. Shell of var. *aberrans*, Dautzenberg, from Mesopotamia.

body-whorl. The colouration is variable. Most of the specimens have zigzag vertical stripes of a red, chocolate or dark brown colour alternating with white stripes of the same shape, in a few cases the stripes coalesce here and there to produce a reticulate pattern; still further, a few have a uniform dark-brown or black colour with only a few pale spots. The specimens which Preston regarded as being of an intermediate character between his *T. michoni* and *T. jordani* are no more than uniformly coloured specimens of this form of *N. jordani* and have no relationship with *N. macrii*, var. *michoni*.

The var. *turris* of Mousson (fig. 1*b*) is, as I have stated above, represented by specimens from the River Jordan only. These are much larger, of a subcylindrical shape, have a much less prominent spire and the constriction on the body-whorl is much more impressed. In colour the shells show great variation; the stripes are of various colours as in the typical form but are narrower and

much closer ; a reticulate pattern is also formed in some cases by the fusion of the stripes with one another.

I assign all the Mesopotamian specimens to the var. *aberrans*, Dautzenberg (fig. 1c.), since the constriction on the body-whorl in most cases is quite absent or only faintly indicated. The specimens are, further, less elongate than the typical form and have a comparatively broader columellar area. The colouration is very variable. In some cases the shells are uniformly dark-brown or black, in others they have purple, red, chocolate or brownish wavy stripes alternating with much broader white stripes, while most of them show a distinct network of white spots alternating with coloured ones, the latter formed by the fusion of the stripes with one another. Most of the specimens are of a smaller size than those of the typical form.

Family HYDROBIIDAE.

Specimens of the genera *Tricula*, *Bithynia* and *Amnicola* (*Alocinma*) are represented in the Mesopotamian collections before me. Dr. Annandale (*loc. cit.*, p. 163) assigned an imperfect shell from Nasariyeh to the genus *Lithoglyphus*, Mühl., with some doubt. I have examined this specimen and agree with Dr. Annandale in considering it as possibly belonging to the genus *Lithoglyphus*, but it is too imperfect for a precise diagnosis.

Genus *Tricula*, Benson.

- 1843. *Tricula*, Benson, *Cal. Journ. Nat. Hist.*, p. 467.
- 1851. *Bithinella*, Moquin Tandon, *Journ. Conchyliol.* II, p. 239.
- 1852. *Paludina* (in part), Küster, Mart., *Chemn. Conch.-Cub., Paludina, etc.*, p. 1.
- 1856. *Bythinella*, Moquin Tandon, *Hist. Moll. Terr.-Fluv. France*, p. 516.
- 1858. *Tricula*, H. and A. Adams, *Gen. Rec. Moll.* I, p. 306, pl. xxxii, figs. 5, 5a, 5b.
- 1862. *Tricula*, Benson, *Ann. Mag. Nat. Hist.* X, pp. 415, 416.
- 1863. *Paludinella* (in part), Frauentfeld, *Verh. Zool.-bot. Ges. Wien*, XIII, p. 199.
- 1885. *Tricula* and *Hydrobia* subgen. *Bythinella* (in part), Nevill, *Hand-List. Moll. Ind. Mus.* II, pp. 62, and 49 respectively.
- 1887. *Tricula*, Fischer, *Man. Conchyliol.*, p. 727.
- 1892. *Bythinella*, Kobelt, Rossmässler, *Icon. Eur. Moll.* (n. s.), V, pp. 36, 37.
- 1915. *Tricula*, Preston, *Faun. Brit. Ind. Freshw.-Moll.* p. 68.

I have carefully compared shells of the Himalayan species *Tricula montana*, on which Benson founded his genus, with those of certain European species assigned by most recent authors to *Bithinella*, Moquin Tandon, and can find no generic difference. Kobelt's figures of the various species of *Bithinella*, moreover, strongly support the view that the two are identical. A short review of the confusion that has existed in literature regarding the exact status of the genus *Tricula* may be given before considering the question of its synonymy.

Benson in his original description described the genus as belonging to the Melaniidae, basing his argument partly on shell-characters, which according to him showed the same relationships to *Melania* s.s. as "certain Egyptian and Syrian species of *Paludomus*" bore to that genus; and partly on anatomical grounds, the animal being, according to him, *Melania*-like. In this supposition he was followed by Gray and H. and A. Adams, but Brot in his revision of the Melaniidae, differing from them, stated that the genus was probably referable to the Paludinidae. Benson in his subsequent work slightly elaborated his original arguments, and considered Brot's position untenable owing to the "very fundamental difference between the concentric operculum of *Paludina* and the subspiral one of *Tricula*"; he again laid stress on the resemblance of the animal of *Tricula* to that of *Melania*. Stimpson, Stoliczka, Blanford and Nevill considered *Tricula* to be a Rissoid genus. Fischer in doubtfully placing it amongst the Hydrobiidae compared it with *Acicula*, a genus of land-molluscs, and remarked, "La classification de ce genre est embarrassante." He had, however, come to a nearly correct conclusion. Preston followed him in assigning *Tricula* to the Hydrobiidae, or what he calls Paludestrinidae. I have pointed out above the resemblance between the shell of *T. montana* and that of the various species assigned to the genus *Bithynella*. The resemblance between its animal and that of the genus *Melania*, on which Benson laid so much stress, is only superficial and his own description does not show any differences between the animal of *Tricula* and that of any other Hydrobiid. Assuming, therefore, that the genus is a true Hydrobiid and that there is no difference between it and the genus *Bithynella*, Moquin Tandon, the name *Tricula*, Benson will have priority over Moquin Tandon's.

It may be noted here that the Indian brackish-water species referred to as *Bithynella miliacea* in a recent paper¹ by Dr. Annandale and myself is not assignable to the genus *Tricula*, but has relationships with the genus *Stenothyra*, Benson.

I have here to express my indebtedness to Dr. N. Annandale for pointing out to me the exact status of the genus *Tricula* and for the help he has so generously given me in clearing up its synonymy.

***Tricula palmyrae* (Dautzenberg).**

1918. *Bithynella palmyrae*, Annandale, *op. cit.*, p. 162.

The only specimens of this species are the shells referred to in Dr. Annandale's paper cited above. I have carefully compared them with Dautzenberg's description and figure of the species and can find no differences.

Genus *Bithynia*, Gray.

In the Mesopotamian collection this genus is represented by two species: (i) *B. badiella*, a species common in Palestine and

¹ *Rec. Ind. Mus.*, XVI, p. 248 (1919).

Syria and recently recorded by Dr. Annandale from Mesopotamia and (ii) *B. rubens*, a species widely distributed in Italy, Sardinia, Greece, Algeria, Syria and probably in Upper Mesopotamia.

***Bithynia badiella*, Parreyss.**

1919. *Bithynia badiella*, Annandale, *op. cit.*, p. 162.

In addition to the specimens reported on by Dr. Annandale there is a shell in the collection made by Dr. C. L. Boulenger from the area between Nasiriyeh and Hama Lake, Lower Mesopotamia. These specimens agree closely with the specimens from Palestine and Syria in the Indian Museum collection.

***Bithynia rubens* (Menke).**

1892. *Bithynia rubens*, Kobelt, *op. cit.*, pp. 70, 71. pl. cxxxvii, fig. 866.

Specimens of this very variable species collected by Dr. Boulenger and Dr. Bowell at Basra agree with Kobelt's figures and with the specimens in the Indian Museum collection from Damascus.

Nevill¹ gave names to a number of well characterized forms of the species from various localities and the specimens he marked are in the collection of the Indian Museum. As he did not describe these forms and some of them have since been described by Preston under other names, Nevill's names will have to be taken as *nomina nuda* only, but the whole question is too complicated to be dealt with here.

Genus *Amnicola*, Gould and Haldemann.

Subgenus *Alocinma*, Annandale and Prashad.

1919. *Alocinma*, Annandale and Prashad, *Rec. Ind. Mus.*, XVIII, pp. 23, 24.

1920. *Alocinma*, Annandale *Rec. Ind. Mus.*, XIX, pp. 42, 43.

Dr. Annandale and I recently proposed this subgenus for certain Indian and Persian species hitherto assigned to the genera *Bithynia* and *Amnicola*. We regarded this subgenus as being of an intermediate character between *Amnicola* s.s. and *Pseudamnicola*, both of which also must be considered as subgenera only. Recently Dr. Annandale has pointed out that "*Bythinia ejecta*," a species described by Mousson from Lower Mesopotamia, also belongs to this subgenus.

***Amnicola (Alocinma) ejecta* (Mousson).**

1874. *Bythinia ejecta*, Mousson, *op. cit.*, p. 46.

A few of the specimens in Dr. Boulenger's collection from the banks of the Euphrates at Nasiriyeh and at Feluja agree with Mousson's description and are, therefore, assigned to his species.

¹ *Hand-List Moll. Ind. Mus.*, II, pp. 40, 41 (1885).

At the end of his description of the species he adds the following: "D'après la forme de l'ouverture et surtout du bord, que est obtus à sa terminaison, je considère cette espèce comme une Bythinie, bien que l'opercule manque et que sa petitesse rappelle plutôt les Amnicoles." It is clear from this quotation that Mousson was not quite definite about the generic position of his form. The specimens before me, however, leave no doubt that the species *B. ejecta*, Mousson, as was considered by Dr. Annandale, is not a member of the genus *Bithynia*, Gray, but belongs to our new subgenus *Alocinma*.

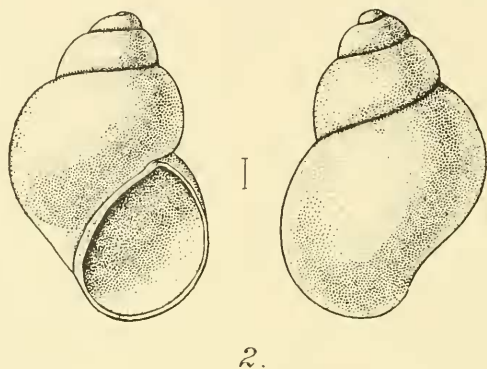


FIG. 2.—*Amnicola (Alocinma) ejecta* (Mousson) from the banks of the Euphrates at Nasiriyeh.

Family MELANIIDAE.

Genus *Melanoides*, Olivier.

Melanoides tuberculata (Müller).

- 1874. *Melania tuberculata*, Mousson, *op. cit.*, pp. 47, 48.
- 1887. *Melania tuberculata*, Schepmann and Snellmann, *Moll. in Veth. Mid.-Sum. Reiz. Ind. Sumatra-Exped.*, pp. 16, 17, pl. iii, fig. 11 (radula).
- 1919. *Melanoides tuberculata*, Annandale and Prashad, *Rec. Ind. Mus.*, XVIII, pp. 31, 32, pl. vi, fig. 1.

In the paper cited above Dr. Annandale and I have given the diagnostic characters of this widely distributed and very variable species. The radula of the mollusc had been figured by us previously in another paper.¹ Schepmann had previously figured and described the radula of the Sumatran form in the obscure publication cited above. The two differ from one another, but the differences are more apparent than real, being due mainly to different views of the teeth having been figured; other differences in the number of denticulations are only of the nature of a variation exhibited by the species.

¹ Annandale and Prashad, *Rec. Ind. Mus.*, XVI, p. 146, pl. v, fig. 5 (1919).

The species is represented in the Mesopotamian collection by a large number of dry shells from Basra and a few preserved in spirit from the banks of the Euphrates. Most of the specimens are rather small but a few measuring up to 35 mm. in length are also represented.

Melanoides pyramis, var. flavida (Nevill).

1919. *Melanoides pyramis* var. *flavida*, Annandale and Prashad, *op. cit.*, pp. 34, 35.

In the paper cited above we referred to a rather dark specimen of this form collected by Dr. C. L. Boulenger from the flooded area near Khandag creek, Basra, Lower Mesopotamia. This specimen agrees in all particulars with the specimens from the Persian frontier and Baluchistan, but is darker in colour. It measures 27.5 mm. in length by 9.9 mm. in breadth, the aperture measures 9.8 mm. by 5.7 mm.

Genus **Melanopsis**, Férussac.

Melanopsis nodosa, Férussac.

1874. *Melanopsis nodosa*, Mousson, *Journ. Conchyliol.* XXII, p. 48.
 1874. *Melanopsis nodosa*, Brot, "Die Melaniaceen" in Chemnitz, *Conch.-Cab.* (ed. Küster), p. 432, pl. xvi, figs. 17-24 (in part).
 1918. *Melanopsis nodosa*, Annandale, *Rec Ind. Mus.*, XV, p. 163.

The species was recorded by Mousson from the Euphrates and the Tigris below Mosul on the basis of the collections made by Dr. A. Schlaefli in this region, and Annandale has recently recorded its occurrence in Lower Mesopotamia.

In the collections made by Dr. C. L. Boulenger and Dr. E. W. Bowell the species is represented by a large number of shells from Nasariyeh and from Khandag creek, Basra. All the specimens are of the typical *nodosa*-type and none belong to Mousson's var. *moderata*, described in his paper cited above. Most of the specimens are quite fresh and distinctly show the three rows of large tubercles on the body-whorl—a characteristic of this species.

The specimens vary in colour from chestnut-brown to black, except for the subfossil shells which are white and chalky. The largest specimen measures 23.4 mm. in length and 11.3 mm. in maximum breadth; the aperture measures 10.8 mm. by 5.2 mm.

Melanopsis costata (Olivier).

1874. *Melanopsis turcica*, Mousson, *op. cit.*, pp. 48, 49.
 1879. *Melanopsis costata*, Brot, *op. cit.*, pp. 426-429, pl. xlvii, figs. 4-7.
 1913. *Melanopsis costata*, Preston, *Journ. As. Soc. Bengal*, IX, p. 467.

Melanopsis costata is a widely distributed species throughout Syria, Palestine and Mesopotamia. In the Mesopotamian collections under report, it is represented by shells from the banks of a dry creek connected with Diala River between Baguba and Sharoban, and from the Khandag creek, Basra.

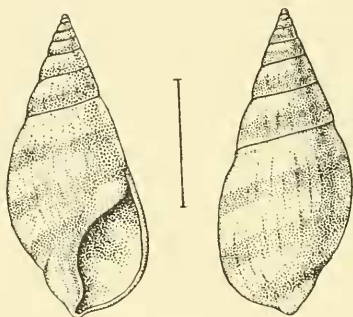
The species, though closely allied to *M. nodosa*, is distinguished from it by the costae on the surface of the shells being more regular and continuous and in having two instead of three rows of tubercles on the body-whorl.

In the large series before me there are shells corresponding to Brot's figures of the *typical* form, var. *B* and *M. turcica bellio*, Parreyss. There are, however, intermediate forms connecting the various varieties and it is therefore not necessary to distinguish them as different forms.

***Melanopsis subtingitana* (Nevill), Annandale.**

1918. *Melanopsis subtingitana*, Annandale, *op. cit.*, pp. 163, pl. xx, figs. 1, 2.

This species has only recently been described by Annandale from two shells in the Indian Museum recorded as *Melanopsis*



3.

FIG. 3.—Type-specimen of *Melanopsis subtingitana*, var. *laevis* from the creek connected with Diala River, Mesopotamia.

costata, var. by the late Mr. G. Nevill, and from two others from Mesopotamia presented to the Indian Museum by Colonel W. H. Lane. Dr. Bowell's collection from Basra also contains a good series of the species. These shells agree closely with the type-shells, except that most of them are a little larger and have the ribs more obsolete.

Var. *laevis*, nov.

Two specimens from Mesopotamia, one from the banks of a dry creek connected with Diala River between Baguba and Sharoban collected by Dr. Boulenger, and the other from Basra by Dr. Bowell, are so different from the typical *M. subtingitana* as to deserve varietal rank. Both the shells are nearly smooth and have the whorls much more regular than in the typical form. In other respects the two shells resemble the forma *typica*.

Type-specimen No. M 11807/2 in the Zoological Survey of India (Indian Museum, Calcutta).

Measurements of shells (in millimetres).

Specimen A is from Basra, and B (the type) from the creek connected with the Diala River.

		A.	B.
Length of shell	..	16·8	17·6
Breadth of shell	..	7·4	8·3
Length of aperture	..	8·2	9·1
Breadth of aperture	..	3·9	5